

FIG. 1

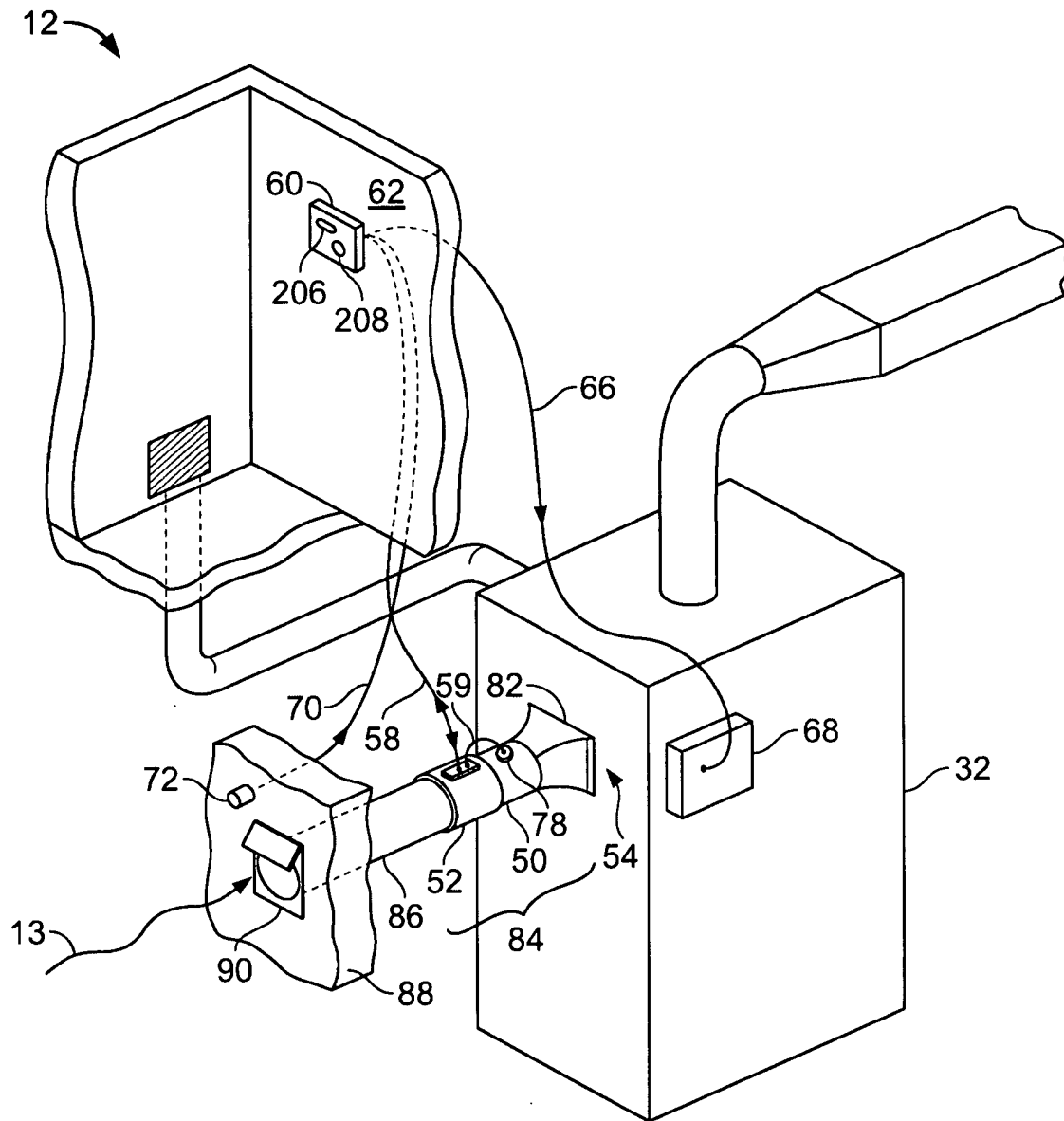


FIG. 2

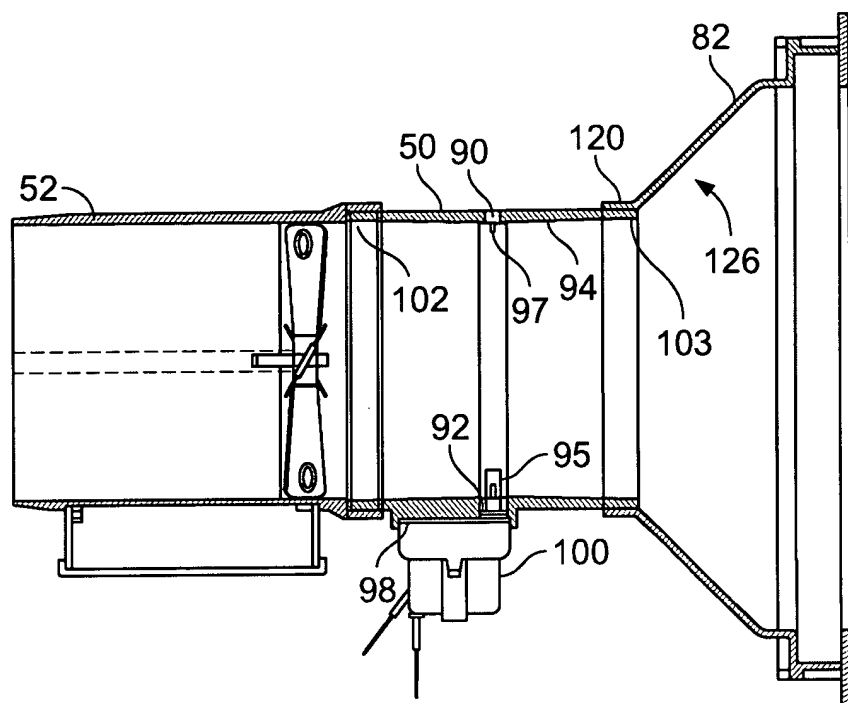


FIG. 3

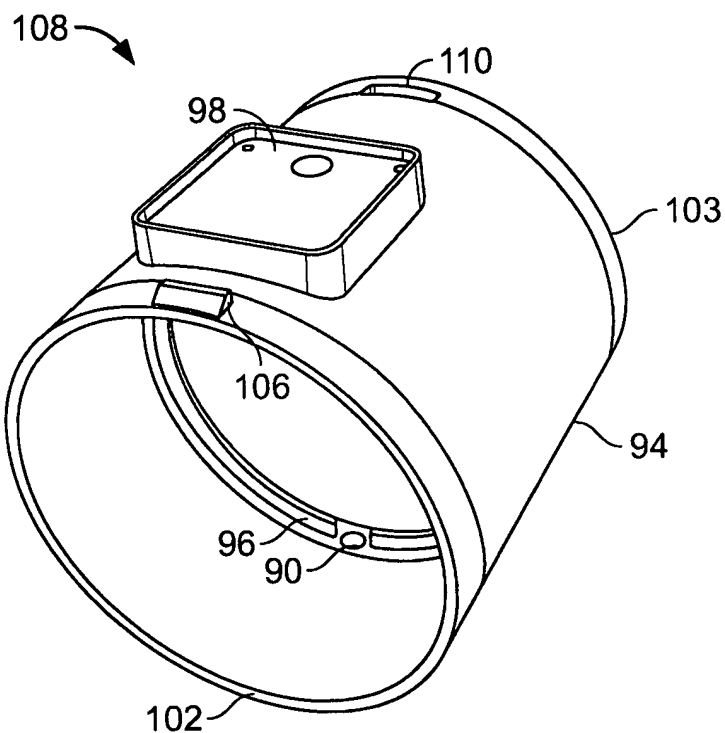


FIG. 4

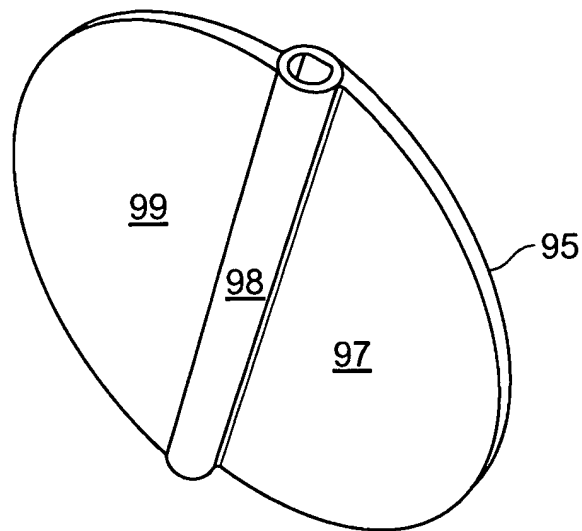


FIG. 5

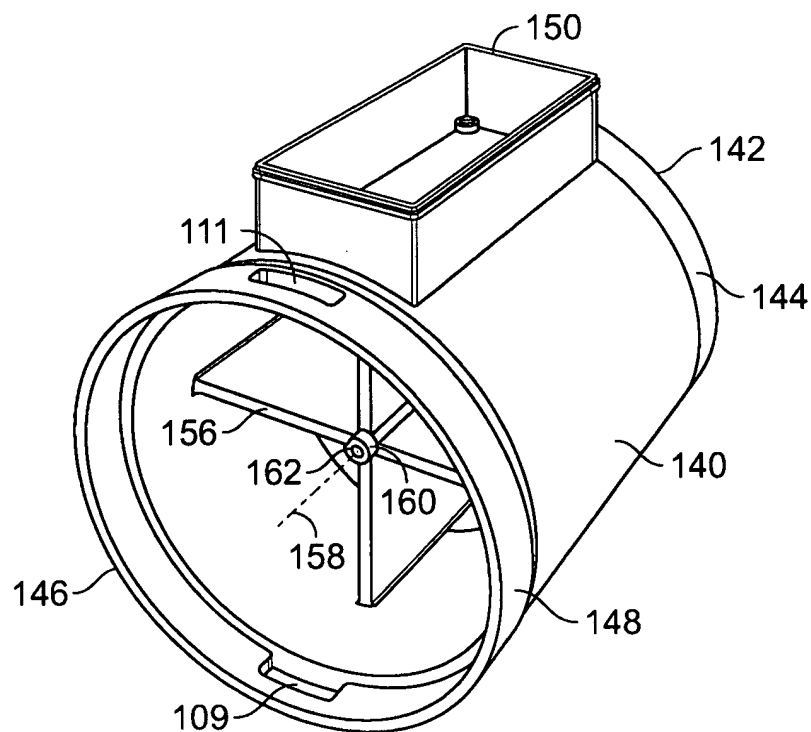


FIG. 6

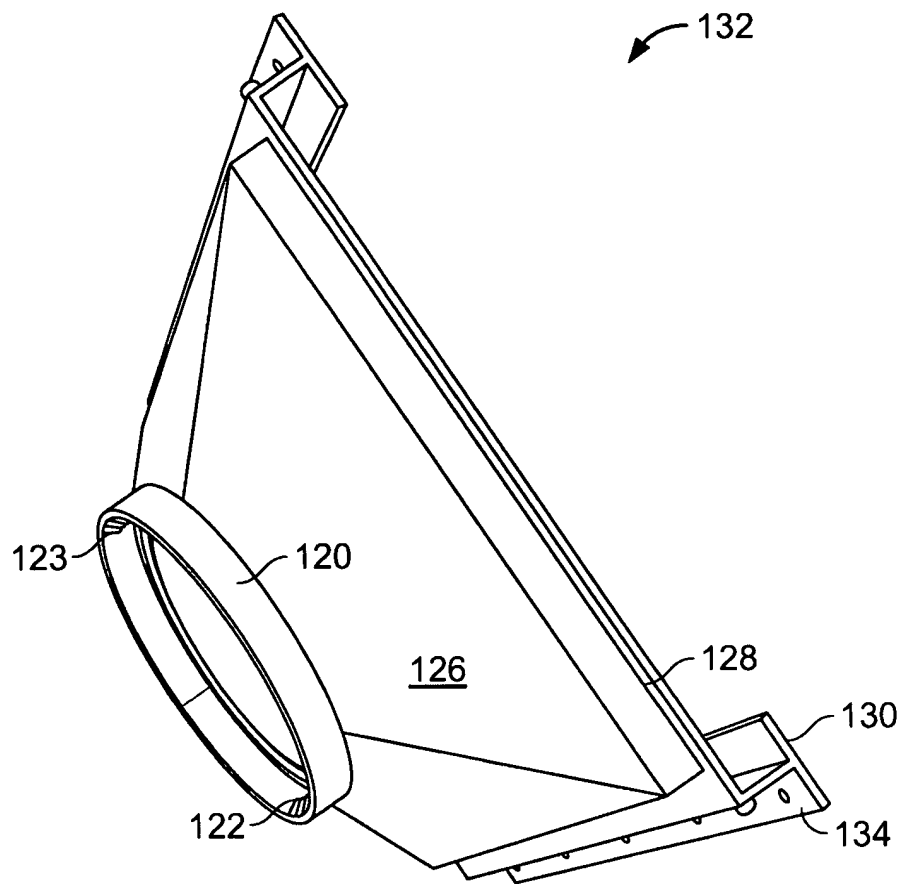


FIG. 7

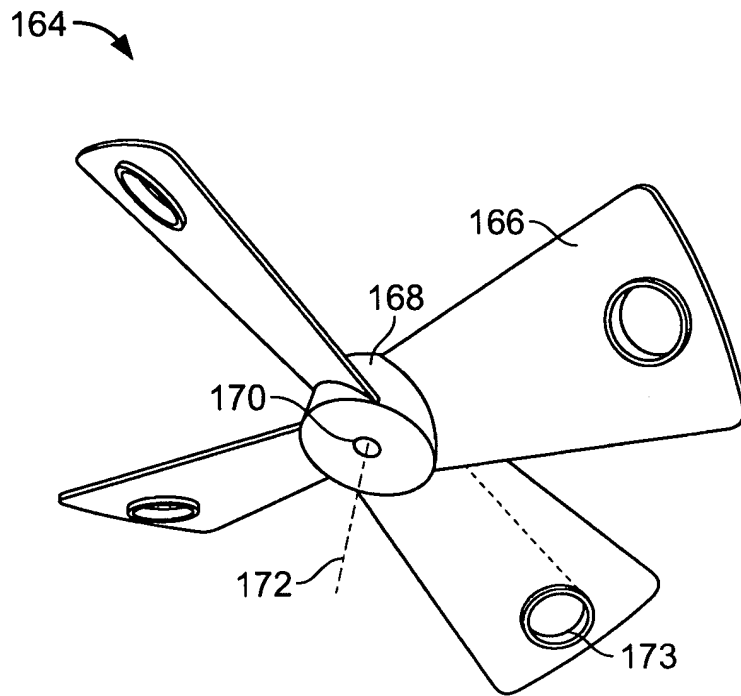


FIG. 8

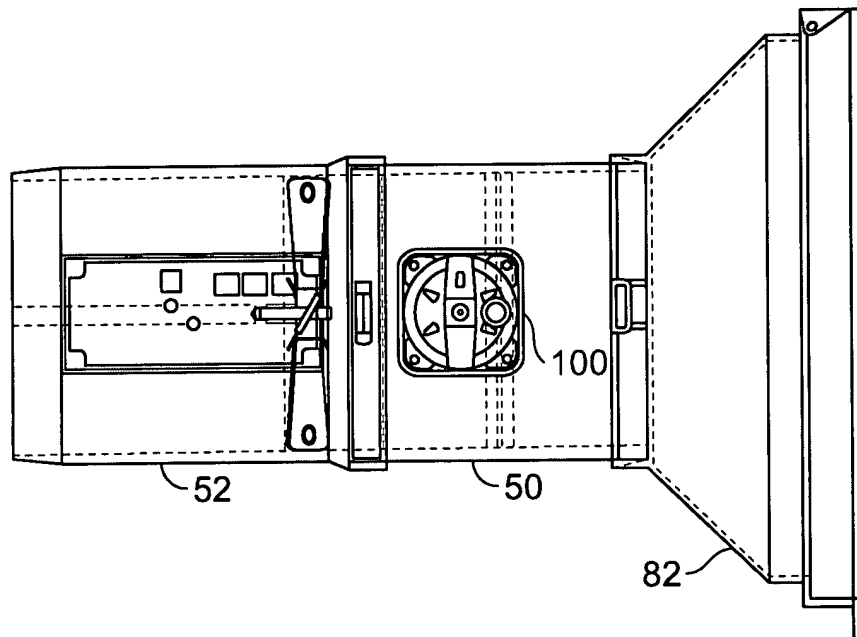


FIG. 9

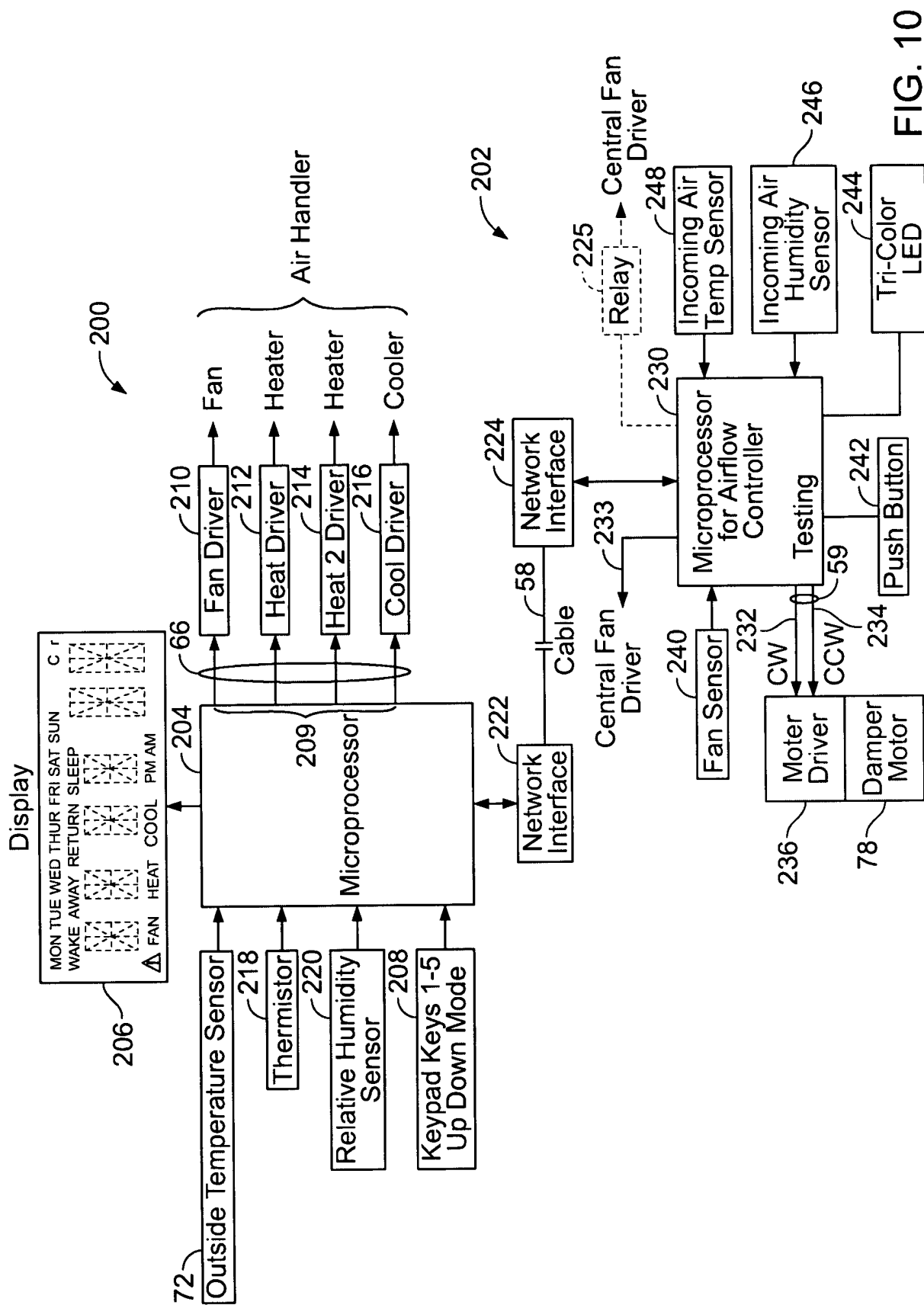


FIG. 10

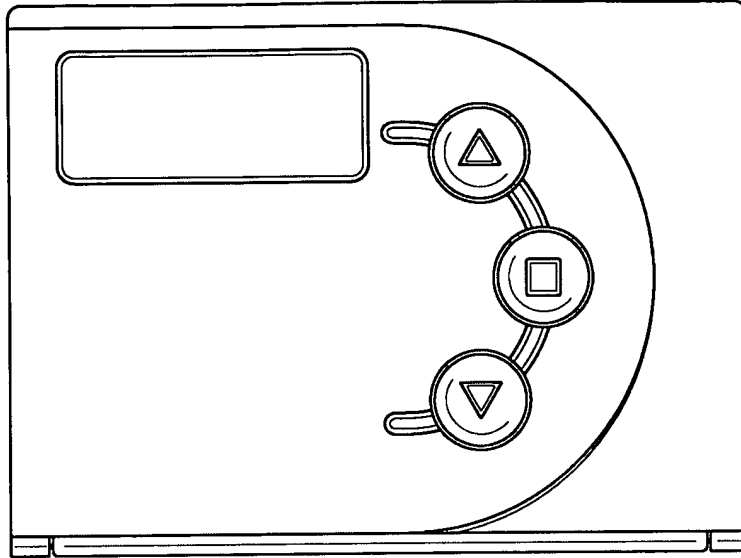


FIG. 11A

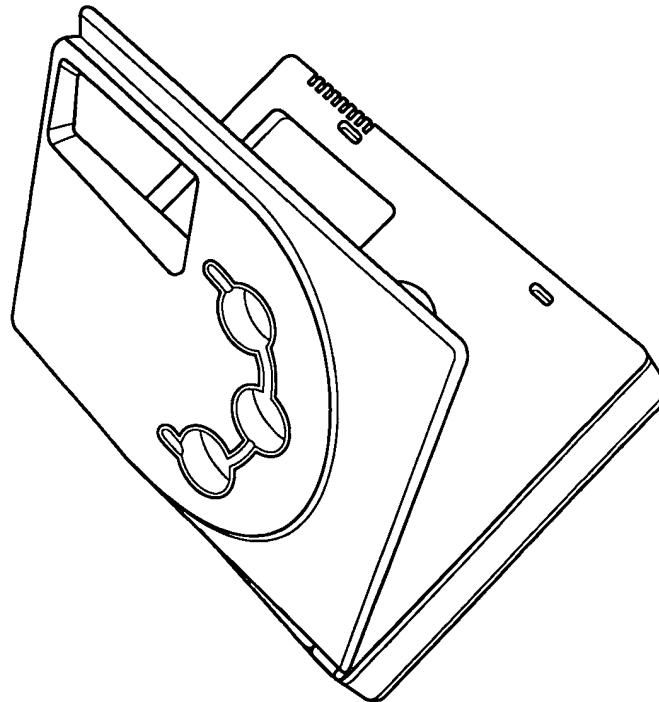


FIG. 11B

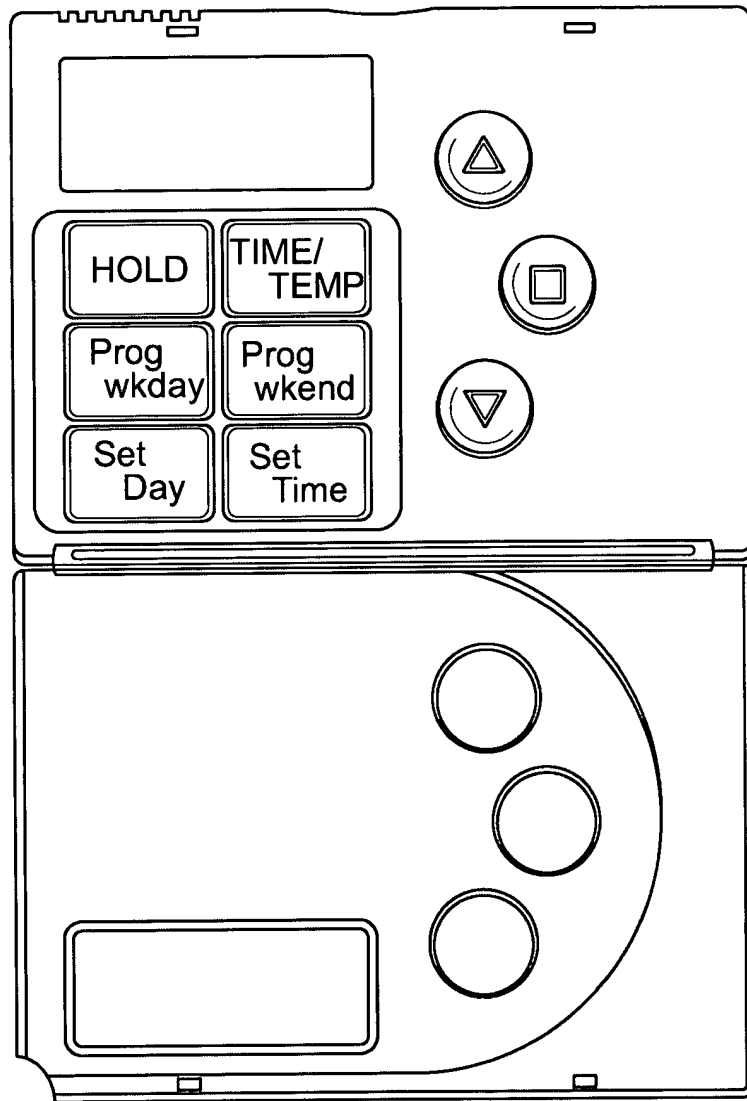
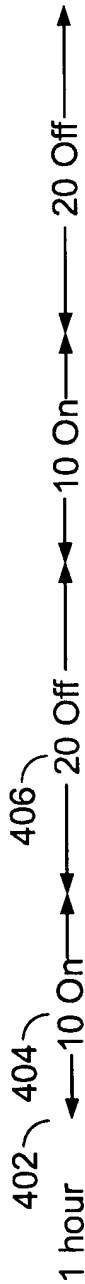


FIG. 11C

Desired fan duty cycle = 33%
 Desired period = 30 Minutes

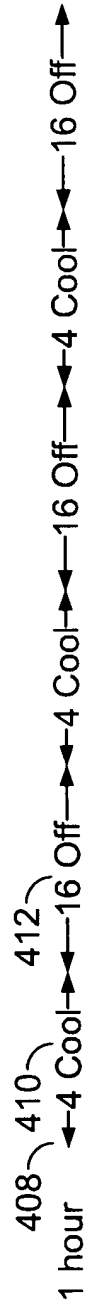
Example: Fan on = 10 minutes
 Fan off = 20 minutes

No call for heating or cooling Fan is on for 10 minutes per 1/2 hour, no error.



Example: Air-conditioning is on.
 There is a 4 minute call
 for cooling then another
 call for cooling after 16 minutes

Total run time was 8 minutes
 first half hour, 4 minutes second half
 hour or an average of 12 minutes/hour.
 Error = 40%



20 Minutes off time is never met to force fan on, short on time was not taken into account

FIG. 12

Desired fan duty cycle = 33%
Desired period = 30 Minutes

Fan period = 30 Minutes
 Fan min run time = 10 Minutes
 Same target as example 1.

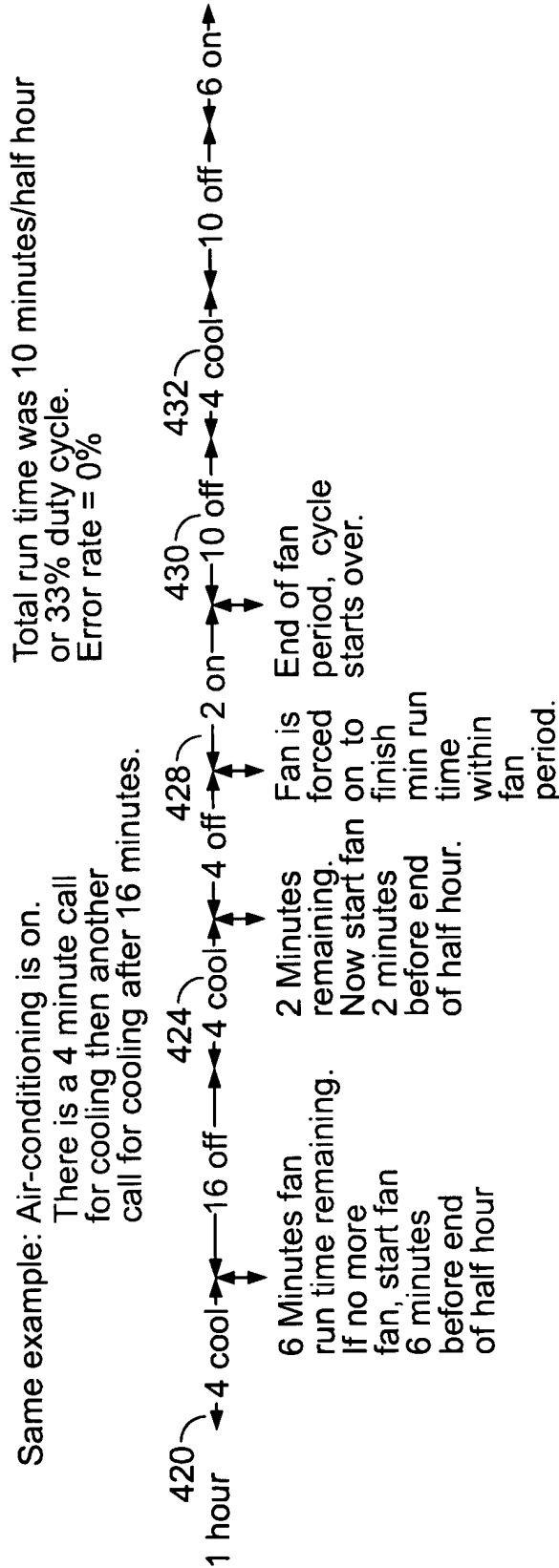


FIG. 13

Desired vent open = 33%

Example: Vent open = 10 minutes
Vent closed = 20 minutes

450
1 hour
←10 heat→←5 off→←10 heat→←5 off→←10 heat→←5 off→←10 heat→←5 off→

Damper is open 20 minutes/
1/2 hour or 40 minutes/hour
when desired 33% duty would
be 20 minutes/hour.
Error rate = 100%

Same example: Heat is on.
There is a 10 minute call for heating then another call for heating after 5 minutes

FIG. 14

Vent timing - new method, measure flow volume.

Example: Fresh air rate is set at 30cfm. A_F
 Fan run time is set to 10 minutes. F_M
 Fan duty cycle is set to 30 minutes. F_P

Controller calculates a required flow rate A_R of 90 cfm for 10 minutes every 30 minutes to meet 30 cfm constant flow

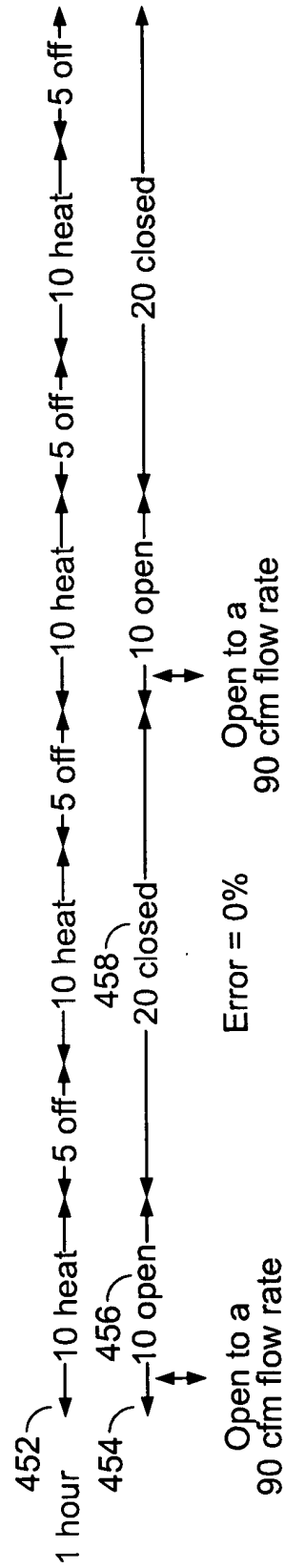


FIG. 15

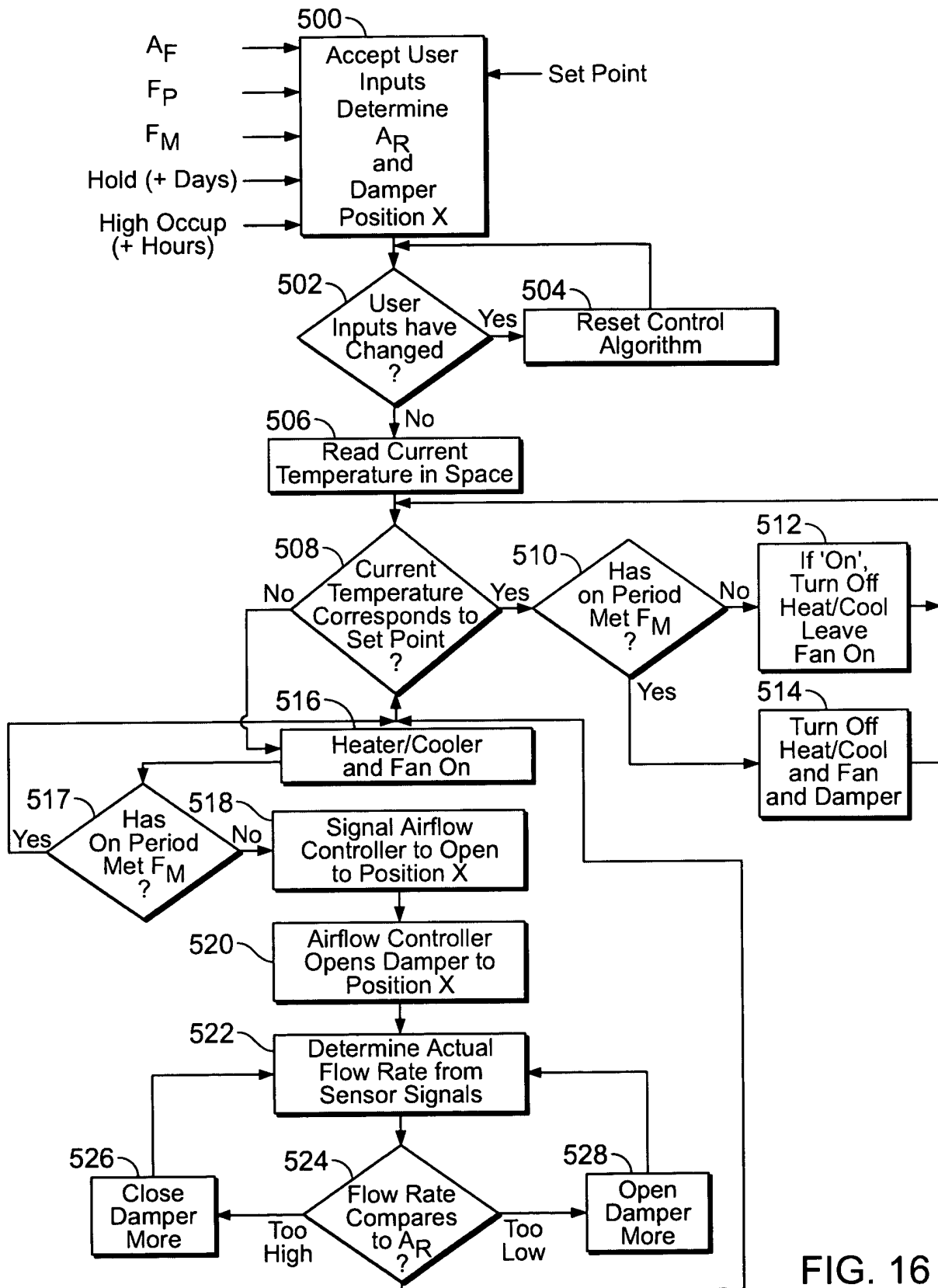


FIG. 16